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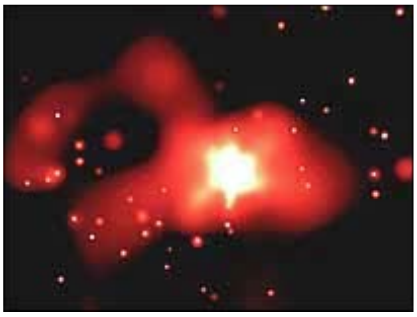
Galactic impact makes black holes

By Dr David Whitehouse
BBC News Online science editor

Astronomers have seen a trail of black holes scattered across space formed by a titanic collision between galaxies. They were detected in the NGC 4261elliptical galaxy observed by the orbiting Chandra X-ray telescope.



X-rays reveal black holes scattered around the galaxy

The holes are all that remains of streams of stars thrown out into space after two spiral galaxies crashed into each other a few billion years ago.

The new data support the theory that large, almost featureless, elliptical galaxies are formed in spiral mergers.

NGC 4261 is about 100 million light-years away from our Solar System.

'Something unusual'

The origin of elliptical galaxies has long been a subject of intense debate among astronomers.

Computer simulations support the idea that they are produced by collisions between spiral galaxies. And optical evidence of streams of stars ripped away by gravity from these impacts has been interpreted as evidence for the theory.

Now, Chandra's X-ray observations, which can only be made above the Earth's atmosphere, provide further proof.

> **"Dozens of black holes and neutron stars were strung out across space like beads on a necklace"**
> Andreas Zezas, CFA

"This discovery shows that X-ray observations may be the best way to identify the ancient remains of mergers between galaxies," says Lars Hernquist, of the Harvard-Smithsonian Center for Astrophysics (CFA) in Cambridge, Massachusetts.

"It could be a significant tool for probing the origin of

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elliptical galaxies."

Andreas Zezas, also of the CFA, says: "From the optical and radio images, we knew something unusual was going on in the nucleus of this galaxy, but the real surprise turned out to be on the outer edges of the galaxy.

"Dozens of black holes and neutron stars were strung out across space like beads on a necklace."

The spectacular structure is thought to represent the aftermath of the destruction of a smaller galaxy that was pulled apart by gravitational tidal forces as it fell into NGC 4261.

As the doomed galaxy fell into the larger one, streams of gas were pulled out into long tidal tails.

As these tidal trails fell on to the larger galaxy, shock waves triggered the formation of large numbers of massive stars, which over the course of a few million years evolved into neutron stars or black holes.

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